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# Kongeriget Danmark

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The attached photocopy is a true copy of the following document:

- The specification, abstract, claims and drawings as filed with the application on the filing date indicated above.



Patent- og  
Varemærkestyrelsen  
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Taastrup 14 August 2000

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08 JULI 1999

**Title:**

Body Armour with a skeletal structure and independently moving parts

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**Abstract:**

Body armour made from a multiple of protective parts, each covering a different segment of the body and connected to a skeletal structure most closely comparable to a back bone structure with a single rib section to which the protective parts are fastened.

The parts covering the chest section sit tightly to follow the body movement allowing for greater mobility and comfort.

The sections covering the abdomen slide over each other like tiles allowing for no impediments to body movement or downward rotation of the torso.

The last (bottom) segment is fastened to the belt straps on ones trousers ensuring that it sits in position when moving away from a potential attacker arching ones back backwards.

The two upper structures on the back are constructed to slide, stretch from the connections and fall back into place depending on how the body moves.

This has been made possible due to the skeletal structure (which is also made of the ballistic materials to be used.)

Lastly the lower back segments overlaps the front where the abdominal segments sit.

**Field of Invention:**

The invention relates to body armour specially designed and engineered to move together with body movement.

### **Background Information:**

Bullet-proof vests using high tenacity fibers eg. Polyaramid fibers used in multilayer structures have been very satisfactory as body armour but the problem of comfort and the impediments to mobility have been somewhat compromised.

Since it is important that the wearer feels comfortable enough to keep his/her vest on when required even for several hours and does not want to compromise movement it is of an essence ~~that these two major attributes are improved greatly.~~

Also important is the concern that movement does not bring bodily parts supposed to be protected out in the open merely because one is trying to move out of a dangerous situation, i.e. as you move backwards and arch away from an attacker with say a knife ones lower abdomen becomes bare with the use of traditional vests.

This does not occur with the above product.

A significant improvement to a significant problem.

### **Summary of the Invention:**

The present invention provides movable parts following body movement allowing for greater comfort, improved mobility and a higher level of safety.

The invention proposes the use of a skeletal spine connected to a single/multiple rib section constructed with ballistic materials i.e. KEVLAR (a Du Pont registered trademark) connected by elastic materials as ex. neophren and connected to sachets of KEVLAR each interconnected (see diagram ) so as to move in a manner which fits and conforms to body movement either because of the fit or the attachment to the skeletal constructions which in turn acts like a central point to which sachets are attached.

If the armoured parts were attached to each other they would simply pull each other out of place increasing discomfort and not solving the problems of, or improving existing solutions.

To get the right fit required to suit the wearer velcro solutions are required to adjust and fit the vest.

### **Method of Manufacturing:**

Several layers of flexible relatively inelastic penetration resistant material are cut into a specific pattern in the given sections and segments.

When the layers have been cut they are then sewn together and put into sachets which in turn are put in the vests' parts. The vests' parts have in turn been attached to the skeletal spine and rib section, the attachments being made by elastic materials and neophren (see diagram 5).

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For the initial pattern design the layers of ballistic fibers can be modelled on a mannequin or a person to ensure the segments are large enough. Diagram shows how these may be constructed.

### **Description of Drawings:**

- |          |   |
|----------|---|
| Fig. 1.: | Front view of vest                                      |
| Fig. 2.: | Side view of vest                                       |
| Fig. 3.: | Back view of vest                                       |
| Fig. 4.: | Skeletal structure with rib section                     |
| Fig. 5.: | Series of drawings showing movement and describing vest |

**What is claimed:**

- 1) Body Armour constructed to follow body movement using a skeletal structure for which the armoured parts are attached allowing for movement equal to body movement.
  - 2) Attachments to belt of trousers allowing segments to stay at exactly the part of the body to which it is intended.
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- 3) Design of vest using skeletal structures fastened by elastic materials (neophren) to body armour allowing for independent movement.
  - 4) Use of skeletal structures to form bases for use of protective clothing due to thick nature of protective parts.

Fig 1.

Front view of vest

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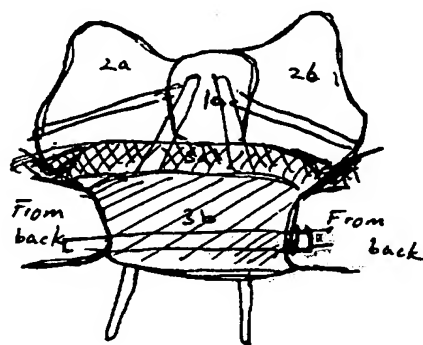


Fig 2.

Side view of vest

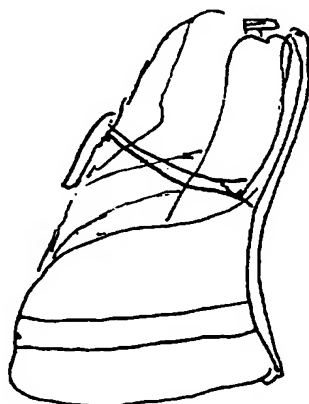


Fig 3.

Back view

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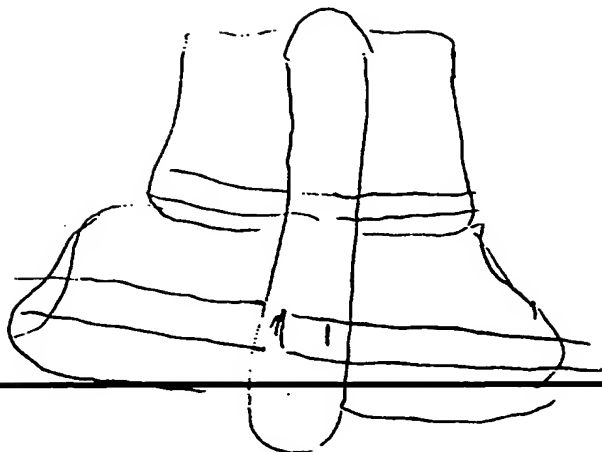


Fig 4.

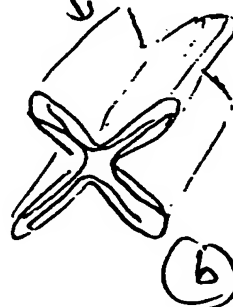
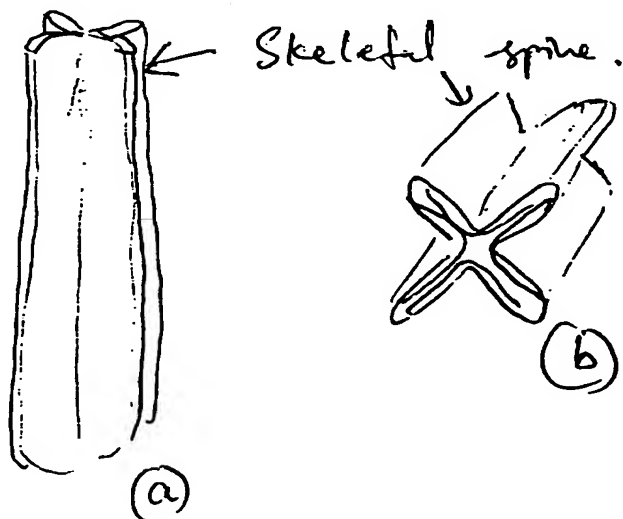
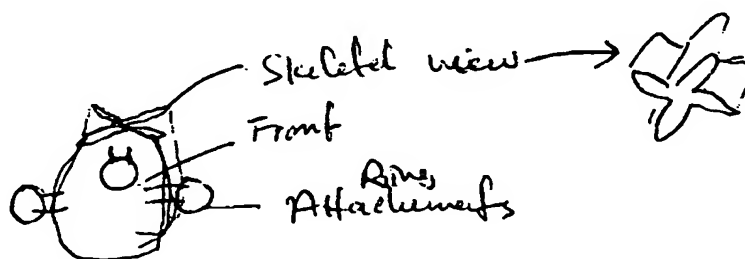
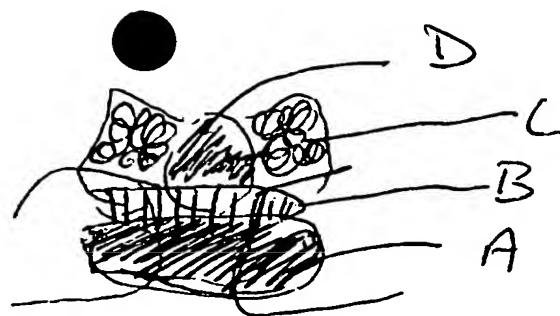


Fig 5.



Front  
Sketch

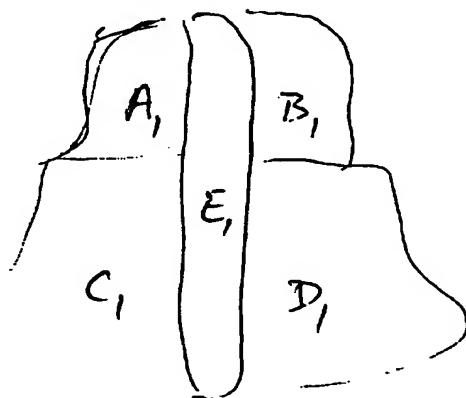
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C attached to D  
in the mid section

B overlaps C & D

A overlaps D

during downward rotation



A<sub>1</sub>, B<sub>1</sub>, C<sub>1</sub> & D<sub>1</sub> attached to E at central  
point allowing for Independent movement.

Each piece being separate.